AMENDMENTS TO THE SPECIFICATION

Please amend the specification at page 1, first paragraph to read as follows.

Q1

This invention relates to a boundary line detection apparatus and method, and an image processing apparatus and method as well as a recording medium, and more particularly to a boundary line detection apparatus and method, and an image processing apparatus and method as well as a recording medium by which ~~juggy~~ jaggy can be suppressed.

Please amend the specification at page 2, line 7 – page 3, line 16 to read as follows.

Q2

FIG. 3 shows the display screen displayed with the pixels shown in FIG. 2. Although the boundary line of the original image data is an oblique straight line, the boundary between the white and black areas on the screen on which it is displayed is displayed in a stepwise shape as seen in FIG. 3. The phenomenon wherein a portion which originally is a straight line is displayed in a stepwise shape in this manner is called ~~juggy~~ jaggy.

In order to solve the problem of the ~~juggy~~ jaggy, pixels in the proximity of the boundary line 1 should be displayed with an intermediate color (in the example shown, gray) of the color data represented by two pixels on the opposite sides of the boundary. In particular, an ideal method for determining a pixel of a display image is to determine, from high accuracy image data arithmetically operated by a computer, an average value of pixel values in the inside of a square 4 centered at a noticed pixel (I, J) and having sides equal to the distance α between pixels of the display image based on the image data as seen in FIG. 5 and use the average value as a pixel value of the display image. An image processing method called supersampling can be used for the calculation.

The supersampling is a method of determining data for a pixel on a screen by dividing the pixel into smaller units called subpixels and using an average value of the subpixels as pixel data of the pixel. For example, one pixel is divided by four in each of vertical and horizontal directions and hence into 16 portions, and rendering is performed for the individual imaginary

pixels. Then, an average value of the imaginary pixels obtained by the rendering is used as a pixel value of the pixel. In other words, the ~~juggy~~ jaggy is suppressed by raising the sampling rate.

Please amend the specification at page 4, lines 3-8 to read as follows.

It is an object of the present invention to provide a boundary line detection apparatus and method, and an image processing apparatus and method as well as a recording medium by which a boundary line can be detected without increasing the sampling rate to remove the ~~juggy~~ jaggy with a simple configuration.

Please amend the specification at page 8, line 22 – page 9, line 8 to read as follows.

In the information processing apparatus and the information processing method as well as the recording medium, a plurality of pixels inputted are stored, and presence or absence of a boundary line in the proximity of the pixels is detected. Then, positions of the boundary line with respect to the pixels are calculated, and pixel values of the pixels are weighted in accordance with the calculated positions. Then, the weighted pixels are outputted. Consequently, the ~~juggy~~ jaggy can be removed with a simplified configuration without increasing the sampling rate.

Please amend the specification at page 9, lines 20-22 to read as follows.

FIG. 3 is a diagrammatic view illustrating ~~juggy~~ jaggy;

FIG. 4 is a diagram showing output pixels preferable for removing ~~juggy~~ jaggy;

Please amend the specification at page 52, line 7 – page 53, line 7 to read as follows.

As described hereinabove with reference to FIG. 5, the ~~juggy~~ jaggy can be removed if an average value of pixel values in the inside of a square 4 centered at a noticed pixel (I, J) and having sides equal to the distance α between pixels of the display image and the average value is used as a pixel value of the display image. Thus, the processing of determining weighting of a pixel value of black and white in accordance with the position of the noticed pixel in the square 4 corresponds to the steps S143 and S146 of FIG. 23 or the steps S144 and S147. Then, the processing of determining an average value of pixel values in the square 4 corresponds to the step S148. It is to be noted that, as can be seen also from the flow chart of FIG. 23, where changing of a pixel value should not be performed (for example, where a boundary line passes the center between pixels), the values of BlendA and BlendB are set to 1, and consequently, substantially no changing of the pixel value is performed in step S148.

The pixel values of inputted pixels are converted by the processing described above so that no ~~juggy~~ jaggy appears when they are displayed, and the pixel values obtained by the conversion are outputted. While, in the example described, weighting is performed based on the distance between a noticed pixel and a boundary line, weighting may be performed based on some other factor.

Please amend the specification at page 55, lines 2-7 to read as follows.

An example of a progressive image determined in this manner is shown in FIG. 25. Pixels in the proximity of the boundary line are outputted as gray pixels each weighted in accordance with the distance between the pixel and the boundary line. Consequently, the ~~juggy~~ jaggy of the progressive image can be removed.

Please replace the Abstract of the Disclosure with the enclosed substitute Abstract of the Disclosure which is on a separate sheet.